1. A method for determining mode spectra of an optical property of a device under test - DUT - in dependence on a spectral parameter, with said mode spectra corresponding to the device's principal states of polarization - PSPs - , the method comprising the following steps:

   - determining minimum envelope values and maximum envelope values of said optical property, or other measured values from which said envelope values can be determined with respect to possible state of polarization of light that is incident upon said DUT, whereby said minimum envelope values and said maximum envelope values are determined for a spectral range of interest of said spectral parameter;

   - deriving the mode spectra of said optical property for at least one of the PSPs as a function of said spectral parameter for said spectral range of interest, whereby a partial correspondence of said mode spectra with said minimum and maximum envelope values is used for deriving said mode spectra.

2. The method according to claim 1, wherein said spectral parameter is either the wavelength or the frequency of the light incident upon said DUT.

3. The method according to claim 2, wherein, from said mode spectra, and in particular from the peaks of said mode spectra, a polarization dependent wavelength shift of the DUT is determined.

4. The method according to claim 1, wherein said DUT is a planar lightwave circuit, such as an arrayed waveguide grating or a

semiconductor optical amplifier, and wherein said mode spectra are the TE and TM mode spectra of said planar lightwave circuit.

5. The method according to claim 1, comprising a step of analysing where the difference between the maximum envelope and the minimum envelope is smaller than a predefined threshold, in order to identify crossing points where said mode spectra cross each other.

6. The method according to claim 5, wherein said crossing points are determined by means of a search window that is swept over said spectral range of interest, said search window having a well-defined spectral width, whereby, within said search window, a point of closest approach between the minimum envelope and the maximum envelope is determined.

7. The method according to claim 6, wherein the difference between the minimum envelope and the maximum envelope at the point of closest approach within the search window is compared with a predefined threshold, whereby in case said difference is below the predefined threshold, said point of closest approach is identified as a crossing point..

8. The method according to claim 6, wherein a spectral band is defined around the peaks of the minimum envelope or the maximum envelope, whereby the width of said spectral band exceeds the spectral width of the search window, and whereby at most one crossing point is identified within said spectral band.

9. The method according to claim 5, wherein said range of interest is divided by said crossing points into a set of subsections, with said subsections being delimited by said crossing points.

10. The method according to claim 9, wherein said mode spectra are constructed by assigning, for each of said subsections, the respective segments of the maximum envelope and of the minimum envelope to either one of said mode spectra for the PSPs, whereby within a first of two adjacent subsections, the maximum envelope is assigned to a first mode spectrum and the minimum envelope to a second mode spectrum, and within an adjacent subsection, the maximum envelope is assigned to said second mode spectrum and the minimum envelope to said first mode spectrum.

11. The method according to claim 5, further comprising the steps of:

- initially assigning the maximum envelope to a first mode spectrum and the minimum envelope to a second mode spectrum;

- identifying crossing points in ascending or descending order of said spectral parameter, and, for a range of said spectral parameter starting at a respective crossing point, interchanging the assignment of the tailings of said maximum and minimum envelopes to said first mode spectrum and said second mode spectrum.

12. The method according to claim 1, comprising the steps of:

- determining at least part of a transfer matrix of the DUT, such as the Mueller matrix of the DUT, as a function of said spectral parameter;

- determining, at one or more points of reference, polarization parameters for at least one of said PSPs;

- deriving the mode spectra of said optical property in dependence on said spectral parameter from the polarization parameters at said one or more points of reference and the matrix elements of the transfer matrix, whereby said polarization parameters are assumed to be constant over spectral ranges around said points of reference, and whereby the spectral variation of said mode spectra is generated by the dependence of said matrix elements on said spectral parameter.

13. The method according to claim 12, wherein said one or more points of reference are chosen such that at said points of reference, the minimum envelope and the maximum envelope of said optical property are sufficiently far apart to be clearly distinguishable, and that the value of the measured signal is large compared to the measurement error.

14. The method according to claim 12, wherein said optical property is any optical property of the DUT that can be expressed in terms of the polarization parameters for the PSPs and the matrix elements of the transfer matrix, such as transmission, insertion loss, reflectance, etc.

15. The method according to claim 12, wherein the spectral evolution of the PSPs is tracked by determining, for a multitude of points of reference, polarization parameters for at least one of the PSPs, whereby the spacing of the points of reference is chosen in a way that the change of the polarization parameters is small enough that the PSPs at a first point of reference can be clearly related to the PSPs at a neighbouring point of reference.

16. A software program or product, preferably stored on a data carrier, for executing the method of claim 1 when run on a data processing system such as a computer.

17. An apparatus for determining mode spectra of an optical property of a device under test - DUT - in dependence on a spectral parameter, with said mode spectra corresponding to the device's principal states of polarization - PSPs - , said apparatus comprising:

- a minimum/maximum unit adapted for determining minimum envelope values and maximum envelope values of said optical property, or other measured values from which said envelope values can be determined with respect to possible states of polarization of light that is incident upon said DUT, whereby said minimum envelope values and said maximum envelope values are determined for a spectral range of interest of said spectral parameter;

- a mode spectra generation unit adapted for deriving the mode spectra of said optical property for at least one of the PSPs of said incident light as a function of said spectral parameter, which uses a partial correspondence of said mode spectra with said minimum and maximum envelope values for deriving said mode spectra.

18. The apparatus according to claim 17, wherein said minimum/maximum unit determines at least part of a transfer matrix of the DUT, such as the Mueller matrix of the DUT, as a function of said spectral parameter, whereby said minimum envelope values and said maximum envelope values are derived from said transfer matrix.

19. The apparatus according to claim 17, wherein said minimum/maximum unit determines said minimum envelope values and said maximum envelope values of said optical property by varying the polarization of the incident light over various different states of polarization.

20. The apparatus according to claim 17, wherein said mode spectra generation unit analyses where the difference between the maximum envelope and the minimum envelope is smaller than a predefined threshold, in order to identify crossing points where said mode spectra cross each other.

21. The apparatus according to claim 20, wherein said mode spectra generation unit divides said range of interest into a set of subsections, whereby said subsections are delimited by said crossing points.

22. The apparatus according to claim 21, wherein said mode spectra generation unit assigns, for each of said subsections, the respective segment of the maximum envelope and of the minimum envelope to either one of said mode spectra for the PSPs, whereby within a first subsection, the maximum envelope is assigned to a first mode spectrum and the minimum envelope to a second mode spectrum, and within an adjacent subsection, the maximum envelope is assigned to said second mode spectrum and the minimum envelope to said first mode spectrum.

23. The apparatus according to claim 20, wherein said mode spectra generation unit initially assigns the maximum envelope to a first mode spectrum and the minimum envelope to a second mode spectrum, identifies crossing points in ascending or descending order of said spectral parameter, and interchanges the assignment of the tailings of said maximum and minimum envelopes to said first mode spectrum and

said second mode spectrum for a range of said spectral parameter starting at a respective crossing point.

24. The apparatus according to claim 17, wherein said apparatus

- determines at least part of a transfer matrix of the DUT, such as the Mueller matrix of the DUT, as a function of said spectral parameter,

- determines, at one or more points of reference, polarization parameters for at least one of said PSPs, and

- derives the mode spectra of said optical property in dependence on said spectral parameter from the polarization parameters at said one or more points of reference and the matrix elements of the transfer matrix, whereby said polarization parameters are assumed to be constant over spectral ranges around said points of reference, and whereby the spectral variation of said mode spectra is generated by the dependence of said matrix elements on said spectral parameter.

25. The apparatus according to claim 24, wherein said mode spectra generation unit chooses said one or more points of reference such that at said points of reference, the minimum envelope and the maximum envelope of said optical property are sufficiently far apart to be clearly distinguishable, and that the value of said optical property is large compared to the measurement error.

26. The apparatus according to claim 17, wherein said apparatus

- determines at least part of a transfer matrix of the DUT, such as the Mueller matrix of the DUT, as a function of said spectral parameter,
- determines, at one or more points of reference, polarization parameters for at least one of said PSPs, and
- sets the polarization state of the light from a polarization controller to the DUT according to said polarization parameters and at least part of said transfer matrix, and measures the optical property for at least one of said PSPs over a range of the spectral parameter around the respective point of reference.